its proximity to a line of great earth-movements during a late geological period. Established at this centre, he entered upon the task of enlisting the aid of Government departments, public institutions, and private individuals to his great work. Before he died he had the satisfaction of having forty observing stations, all furnished with his own type of seismometer, in constant correspondence with him. The careful tabulation and discussion of the records from these observatories had occupied him during the last seventeen years, and the results have been given to the world in a series of circulars and reports by the British Association, the society which, so far as its means have allowed, has constantly subsidised and published Milne's work; in later years the Royal Society has extended its powerful support to him.

To readers of NATURE it is not necessary to enlarge on the results of Milne's labours since his return to England. His important work in tracing the cause of the fracture of submarine cables; his determination of the sites of distant earthquakes from seismographic records; his proof of the distinction between vibrations that travel *through* the earth, and those going *round* it; and many other suggestive contributions, are familiar to everyone.

No more striking proof of Milne's remarkable activity can be afforded than the fact that while the British Association has, since the year 1841, published fifty-three reports on seismology, in which 562 communications are embodied, no fewer than 463 of these are from the pen of Milne! And all are in addition to his books and numerous articles in scientific and other journals.

The eighteenth (alas! it is the last!) of the luminous reports prepared since his return to England is now in the press, and will be presented at the forthcoming meeting of the British Association. It fittingly concludes with a touching and generous obituary notice of his Japanese assistant, Shinobu Hirota (the faithful "Snow"), who returned home to die last April. But, indeed, Milne's was an ever-generous soul. Students of seismology from all lands visited Shide, and were always warmly welcomed by Milne, often partaking of his hospitality. Not only these, but idle tourists, journalists in search of "copy," teachers with their pupils, and even children, were ungrudgingly received. In spite of his exacting labours, he seemed ever ready to show his instruments and talk about his work with the most casual visitor.

Some, perhaps, may suggest that Milne was wanting in sympathy with the work of co-ordinating the results of other organisations than his own; and it may be admitted that his Pegasus did not run well in harness. But it must be remembered how, from the first, he had been accustomed to bear all the weight and responsibility of great enterprises on his own broad shoulders. John Milne's death is indeed a great calamity for science—how great will only be realised when the attempt is made to supply his place.

J. W. J.

NOTES.

THE Baly medal has been awarded by the Royal College of Physicians to Dr. J. S. Haldane, F.R.S., reader in physiology at the University of Oxford, in recognition of his distinguished contributions to physiological science.

PROF. W. C. MCINTOSH, F.R.S., professor of natural history in the University of St. Andrews, and director of the Gatty Marine Laboratory, has been elected president of the Ray Society in succession to the late Lord Avebury.

THE death is announced of Mr. T. H. Russell, of Birmingham, who was a fellow of the Linnean Society and the author of a work on mosses and liverworts.

A PARAGRAPH in *The Times* of August 2 states that there are 106 clocks attached to premises in the City of London, and observable from the public way. Of these, forty-two are synchronised from Greenwich Observatory. There are, in addition, twenty-nine church clocks in the City (including St. Paul's Cathedral), none of which are synchronised or even unanimous in their irregularity.

IN a letter published in *The Scotsman* of July 24, Dr. John G. Havelock, of Montrose, describes some observations which have led him to conclude that common varieties of the single petunia are true insectivorous plants. Mr. Alex. Johnstone, of the same town, has sent us an account of observations of his own which suggest the same conclusion. Sir Herbert Maxwell, in *The Scotsman* of July 28, thinks *Rhododendron barbabum* also deserves attention as probably an insectivorous plant. Only a careful experiment can determine the accuracy of the suggestion that Petunia is insectivorous, and it may be hoped the point will receive the attention of plant physiologists.

THE exhibited collection of Mesozoic crocodiles in the Geological Department of the British Museum (Natural History) has just been rearranged to incorporate some important recent acquisitions. A new specimen of Mystriosaurus from the Upper Lias of Würtemberg, prepared by Mr. B. Hauff, is one of the finest known examples, with almost complete limbs. The stomach-contents are seen, mingled with swallowed pebbles. A specimen of Geosaurus, from the Lithographic Stone of Bavaria, shows for the first time the triangular tail-fin by which this essentially marine crocodile propelled itself. The unique example of the Wealden river-crocodile Goniopholis, discovered a few years ago by Mr. R. W. Hooley in the cliff near Atherfield, Isle of Wight, and described by him in the Geological Society's Journal, has also been mounted and exhibited.

THE sixtieth birthday of Prof. W. Ridgway was fittingly commemorated a few days ago by a dinner at Caius College, Cambridge, attended by scholars and men of science from all parts of the kingdom. Few archæologists of the present day have done more, by original work, stimulating instruction, and the application of anthropological methods in the solution of historical problems, to advance English scholarship. His treatises "The Origin of Currency and Weight Standards," "The Origin and Influence of the Thoroughbred Horse," and "The Origin of Tragedy," have advanced our knowledge of prehistoric archæology, while his separation of the northern and southern elements in early Greek history, received at first with almost generally hostile criticism, has passed into the region of orthodox commonplace in the light of the Cretan discoveries by Sir A. Evans. It is much to be desired that the completion of his admirable work, "The Early Age of Greece," will not be much longer delayed.

THE death is announced, in his sixty-sixth year, of Sir Richard Powell Cooper, a distinguished agriculturist, who played a very large part indeed in developing the enormous industry in exporting pedigree live-stock, which has now become a recognised part of British agriculture. He was also a member of the firm of Cooper and Nephews, chemical manufacturers and exporters of live-stock; this firm set up laboratories at Watford and Berkhamsted, and made chemical preparations for agricultural and horticultural purposes, and also conducted a number of investigations bearing on these substances. Sir Richard farmed a large estate at Shenstone Court, Lichfield, and he also owned land and live-stock in Australia, the Argentine, South Africa, Paraguay, Russia, and elsewhere. He was an exceedingly good business man, and introduced business methods into branches of agriculture and horticulture where such methods had previously been wanting. In particular he played a great part in revivifying the Royal Agricultural Society, when a few years ago it came dangerously near to collapse.

As the white man spreads over the tropical regions of the earth, he comes continually into contact with new and unfamiliar forms of disease, often of a deadly kind. One of the most recent additions to the white man's burden is a peculiar malady known as Verruga (or Verruca) Peruana, also as Fiebre de la Oroya, or Carrion's fever, described by Darling as "an infectious disease in which a fever of irregular type, associated with more or less severe anæmia, is followed by a wart-like eruption of the skin and sometimes of the mucous or serous membrane." Two forms of the disease are recognised, malignant and benign. It occurs in certain valleys on the western slopes of the Peruvian Andes at altitudes of from 1000 to 12,000 ft., most often between 2000 and 6000 ft. According to the researches of Mayer, Rocha-Lima, and Werner (*vide* Tropical Diseases Bulletin, No. 12, p. 727), the parasitic cause of the disease is one of the problematic class of organisms known as Chlamydozoa. In a recent letter to *The Times* (July 12) Dr. Anderson states that, according to a telegram from Mr. Billinghurst, President of the Peruvian Republic, it has been discovered by Prof. Townsend, of Lima, that verruga is transmitted by one of the small blood-sucking midges of the genus Phlebotomus. These insects are small, hairy, moth-like flies, widely distributed in tropical or subtropical regions; one species is known to transmit "Papataci fever" in Dalmatia, and by some authorities the dissemination of Oriental sore is also attributed to midges of this genus.

MR. W. M. NEWTON has republished from the Journal of the British Archæological Association for last March an important paper entitled "Palæolithic Figures of Flint Found in the Old River Alluvia of England and France, and called Figure Stones." These are nodules of flint assuming the shapes of animals or of animals' heads. These objects were discussed by Boucher de Perthes in his "Antiquités Celtiques et Antédiluviennes," published in 1849, and by the late Sir John Evans in *Archaeologia*, vol. xxxviii., 1860, the latter eminent authority regarding them as "the effects of accidental concretions and the peculiar colourings and fracture of flint, rather than as designedly fashioned." Mr. Newton has, in recent years, found similar objects in a gravel-pit at Dartford, Kent. In the present paper he describes his fine collection, and suggests their analogy with specimens found in Egypt and elsewhere. The full materials and fine illustrations supplied will enable archæologists to study the facts, which are certainly striking. Meanwhile, the conclusions of Sir John Evans do not appear to be materially affected by the fresh evidence now presented.

A REMARKABLE group of long-snouted representatives of the Lower Tertiary perissodactyle family Titanotheriidæ, from the Uinta beds of Utah, forms the subject of a paper by Mr. E. S. Riggs in the Geological Publications (vol. iv., No. 2) of the Field Museum, Chicago. Four generic types (one of which, Rhadinorhinus, is described as new) are recognised in this group, collectively forming the subfamily Dolichorhinæ.

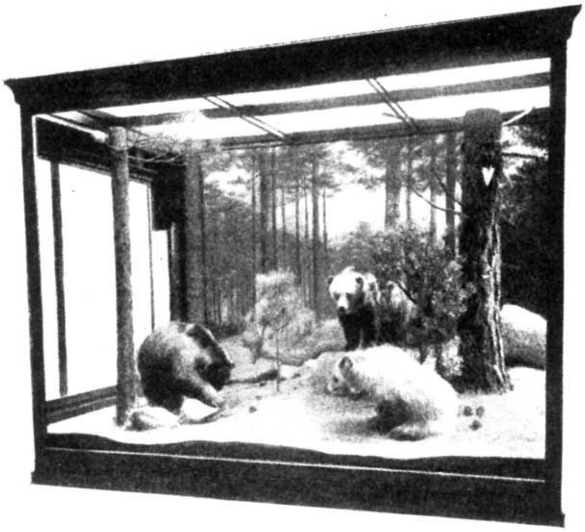
IT is well known to poultry-breeders that birds produced by crossing white Leghorns with black or dark-coloured breeds frequently exhibit a barred plumage ("cuckoo-marking"), of which there is no trace in either of the parent stocks. As the result of experiments, Dr. P. B. Hadley is enabled to demonstrate, in the July number of *The American Naturalist*, that this barring occurs in a certain proportion of such cross-bred birds of the F_2 and subsequent generations, and that the pattern is derived from the white stock. The result of the experiments has, however, no bearing on the ultimate origin of this type of marking, but merely indicates the existence in white Leghorns of factors tending to produce both black and barring.

ACCORDING to an illustrated article by Prof. C. L. Edwards, in the June number of *The Popular Science Monthly*, "abalones," as the various species of Haliotis are locally called, are extensively fished in California, both as a food-supply and for the sake of their shells, which form an important source of mother-of-pearl, and, when polished, are also used as ornaments and as shades for electric lights. A considerable number of pearls are also yielded by abalones. The price of the shells ranges from 1000 to 4000 dollars per ton, and the total value of the shells and flesh taken at Long Beach alone during the year ending in July, 1912, was no less than 95,800 dollars.

TO part 4 of the first volume of *Mitteilungen landwirtschaft. Lehrkanzeln k.k. Hochschule für Boden-*

kultur (Vienna, 1913), Dr. Paul Saborsky contributes an exhaustive and well-illustrated account of Welsh black cattle, in which their characteristic features, corporeal measurements, osteology, and etiology are dealt with in detail. The author fully endorses the opinion that these cattle are nearly related to the extinct black aurochs (*Bos taurus primigenius*) on one hand, and to the white British park-cattle on the other, such resemblances as they display to the Celtic shorthorn (*B. longifrons* or *brachyceros*) being, perhaps, inherited from a local race of the aurochs. It is to be regretted that as the memoir is written in German it is not likely to be widely read in this country.

ACCORDING to the report for 1912 the Field Museum of Natural History, Chicago, continues to make rapid progress, both in the matter of adding to its scientific collections, and in the installation of realistic exhibits in the public galleries and halls. The report is illustrated with photographs of several of these striking exhibits, including a group of grizzly bears in a forest and a colony of beavers on a dam in one of the great rivers; in all of these the foreground is occupied by the animals themselves, mounted with their natural inanimate surroundings, while the background is artistically painted.



Sonoran grizzly bears in the Field Museum, Chicago.

DURING a visit to a whaling station in the Faröes in the summer of 1911, Dr. L. Freund had the opportunity of studying portions of the anatomy of several species of whales, and has published the results of his investigations in the issue for November and December, 1912, of the *Sitzungsberichte* of the Vienna Academy of Sciences. It may be recalled that a short time ago reference was made in NATURE to Mr. T. B. Goodall's opinion with regard to the homology of the whalebone plates of the whalebone whales. According to Dr. Freund, this opinion is by no means new, but was long since adopted by Eschricht, who contended, in opposition to current views, that the plates do not represent the palatal rugæ of land animals. If we understand him rightly, Dr. Freund appears inclined to support this interpretation, although he points out that there are considerable differences in the structural arrangement of the plates in different groups of whalebone whales. Other items in cetacean anatomy are also discussed in the paper, which likewise contains a section on the genitalia of the porpoise.

WE have received from the Government Printing Office, Calcutta, a series of extremely useful notes on Indian timbers (Forest Bulletins Nos. 16 to 21, price 4*d*. each). The timbers dealt with are *Gmelina arborea, Pterocarpus marsupium, Terminalia tomentosa, Lagerstroemia lanceolata, Ougeinia dalbergoides,* and *Anogeissus latifolia.* Each of these bulletins gives the distribution, locality, and habit of the tree, properties and uses of the timber, minor products, if any, natural reproduction and rate of growth, and other information, and includes a specimen of the wood in the form of a thin section mounted in a stout cardboard frame. These bulletins form part of a series of notes on the lesser-known Indian timbers, compiled by officers of the Forest Research Institute, Dehra Dun, and it is announced that on application to the forest economist specimens of any timber will be supplied free, and inquirers put in communication with local forest officers.

As a result of much recent work on the effect of various metal salts on plant growth in water culture, pot culture, and in the field, the possible value of manganese salts as fertilisers is discussed in a leaflet published by the U.S. Bureau of Soils, Circular No. 75. Beneficial effects have been observed in the cultivation of numerous crops, and in many cases the increase has been very appreciable—upwards of 25 to 30 per cent. Its effect in soils is attributed partly to a direct action on the soil constituents, partly to an acceleration of enzymic changes in the plant, and also to the stimulation of micro-organisms in the soil. It has further been found that manganese increases the absorption of other ingredients by the plant, particularly lime and magnesia. For experimental work and as a complementary fertiliser to sodium nitrate, phosphates, potash, and lime, the use of soluble manganese salts in quantities not greater than 100 lb. per acre is recommended.

IN connection with the movement for the conservation of natural resources in the United States, an investigation has been made into the occurrence of potash salts in such amounts as to warrant their extraction on a commercial scale (U.S. Bureau of Soils, Bulletin 94). In no case has an artificial or natural (subterranean) salt been found suitable for further extraction, but the bitterns derived from the manufacture of salt from sea-water contain potassium in such amounts as to make it probable that they could be evaporated to make valuable manure salts. In addition to this, the brine of one desiccated lake of southern California has been found to contain sufficient potash to make it a possible commercial source, but the largest and most practicable source is to be found in the giant kelps of the Pacific littoral.

WE have received the first part of the *Palaeontologische Zeitschrift* (Berlin: Gebrüder Borntraeger, price 25 marks annually), the publication of the Palæontologische Gesellschaft, which was founded in Germany last autumn. The society is intended to be of an international character, and besides about 130 German palæontologists, it already counts nearly eighty members in other countries. The headquarters are in Berlin, and a meeting is to be held once a year in some locality, either in Germany or in another country, where there is an important collection of fossils or where the fossiliferous strata are of special interest. The first president is Prof. Otto Jaekel, of Greifswald, and on the council the representatives of Great Britain and the United States are respectively Dr. Smith Woodward and Prof. Charles Schuchert. The published *Zeitschrift* deals with fossils from every point of view, but especially in their biological aspect, and begins with a presidential address on the study of palæontology in general. Prof. Jaekel quotes O. Merkel's claim to have discovered that fossils were intelligently collected even so far back as the Bronze age. One or two examples of each of fifty-eight species of Tertiary shells are said to have been found, with two recent Mediterranean species for comparison, in a cinerary urn of this period. Prof. H. Rauff contributes an important illustrated paper on Pharetrone sponges, and Dr. C. Wiman discusses cases of the sudden destruction and burial of swarms or large troops of animals. Prof. Jaekel also begins an account of the remarkable discovery of numerous dinosaurs and other vertebrates in a clay-pit in the Upper Trias of Halberstadt, north Germany.

To the July number of *Symons's Meteorological Magazine* Mr. R. C. Mossman, of the Argentine Meteorological Office, makes an addition to his third article on southern hemisphere seasonal correlations (NATURE, July 17), showing that a relation can be traced between rainfall at Malden Island (South Pacific) and mean temperature at Punta Arenas (Magellan Strait) from May to August. When the rainfall at Malden Island is above the average the temperature at Punta Arenas is below the normal, and *vice versâ*. During the seventeen years 1890–1906 there are only two years, 1894 and 1904, in which the signs are the same, but in each of the four years 1907–10 a low mean temperature at Punta Arenas is associated with a deficient rainfall at Malden Island during the four months in question. Dr. Hildebrandsson has shown that an apparently well-established correlation may break down for a few years, and Mr. Mossman remarks that the case under discussion offers another instance of the snapping of the chain.

A MEMORANDUM on the meteorological conditions prevailing over various parts of the earth before the advance of the south-west monsoon in India, issued by the Director-General of Observatories on June 8, has been recently received. The distribution of pressure is most favourable when the latter is high in March, April, and May in Argentina and Chile, and low in May in the Indian Ocean; on the whole the general pressure conditions appear slightly unfavourable. The inferences to be drawn from the winds and rainfall in the Indian Ocean during the previous two months do not affect the present monsoon prospects very strongly, while the accumulations of snowfall lying on the hills are probably normal. Although no explanation is forthcoming, there is apparently a tendency for years of which the average pressure over India is high to be associated with a good monsoon in the succeeding year, and *vice versâ*; in 1912 pressure was in moderate excess, and the tendency therefore affords grounds for hope. From these indications all that can be inferred is that a large excess or defect in the total monsoon rainfall of India is unlikely.

THE electron theory makes the dielectric constant k of an electrical insulator vary so that $(k-1)/(k+2)$ is proportional to the density. Temperature, therefore, which has little effect on the density, should have little on the dielectric constant. Measurement has shown, on the other hand, that the effect of temperature on the constant is considerable, and Prof. Debye, of Zürich, recently suggested that this effect could be explained by the presence of electrical doublets in the dielectric so long as it is in the liquid state. The product of the absolute temperature into the expression above should then be a linear function of the absolute temperature. This Debye showed to be the case. In the *Verhandlungen* of the German Physical Society for June 30, Dr. Ratnowsky, of Zürich, shows that the dielectric constant should in these circumstances depend to a small extent on the electric field to which the insulator is subjected. A series of measurements by him on a solution of amyl alcohol in benzol made by the alternating-current bridge method has confirmed this deduction and gives the number of doublets per cubic centimetre and their electrical moment in fair agreement with the values found by Debye.

WE have received vol. vi. of the Journal of the Municipal School of Technology, Manchester, which consists of a reprint of the scientific and technical papers which have been communicated to societies or published in the technical Press by members of the staff or by students of the school during the year 1912. Nineteen such papers cover the 267 pages of the journal, and deal with subjects like the investigation of the best form and speed for durability of cutting tools, the forces which produce corrugation of tram rails, the properties of porcelain insulators used in high-tension electrical power transmission, the influence of alkalis in the dyeing of cotton, the action of metallic chlorides in sizing cotton yarn, the action of light on colouring matters. We know of no other technical school in this country which can show so valuable a series of researches turned out in a single year, and we wish the Manchester School every success in its avowed intention, by offering "systematic training in the principles of science and art as applied to industry," of producing "men of character, wide knowledge, and practical experience," and so fostering industry.

THE Optical Convention held at South Kensington on June 19–26 of last year was described in an article published in the issue of NATURE for June 27, 1912 (vol. lxxxix., p. 435). The Proceedings of the convention have now been published for the University of London Press, Ltd., by Messrs. Hodder and Stoughton. The handsome volume runs to 359 large pages, and contains the inaugural address of the president, Prof. S. P. Thompson—extracts from which were published in NATURE of the date mentioned—and the papers read at the convention. The papers are chiefly of a technical description, largely directed to the issues of technical inquiry, and a few are devoted to the details of manufacture. Among the contents of the volume of more general interest may be mentioned the report of Prof. Turner's lecture on the great observatories of America, and Prof. Stirling's popular lecture on optical illusions. A table of constants for calculating spherical aberration forms an appendix; this comprises a selection of logarithms of use in some of the more laborious calculations which the designers of lens combinations have to make. The price of the volume is 10*s*. net.

THE National Academy of Sciences of the United States of America was founded in 1863, and 1913 sees completed the fiftieth year of its existence. It was decided in 1909 to have prepared for publication, in connection with this semi-centenary of the academy, a volume containing as complete an historical summary as could be brought together in the time available. A committee was appointed to take charge of the matter, and in the summer of 1910 the services of Dr. F. W. True were secured as editor. The result of the labours of this committee is seen in the "History of the First Half-Century of the National Academy of Sciences, 1863–1913," a copy of which has reached us from Washington. It was hoped that a list of the scientific communications presented to the academy since its foundation, some two thousand in number, might be added to the volume, but it has been found impossible in the time available to compile the necessary data. The completion of the undertaking is deferred until a later date. The present handsome volume runs to some 400 large pages, and gives exhaustive information as to the founding of the academy, its annals, and its work as scientific adviser of the U.S. Government. Biographical sketches of the incorporators of the academy add interest to the work, while the numerous appendices provide most useful lists of members, medallists, officers, and so on.

MR. FRANCIS EDWARDS, 83 High Street, Marylebone, London, W., has published the August issue of his catalogue of second-hand books in all classes of literature. The volumes listed include a number from the library of Mr. Thomas Pennant, the antiquary and naturalist.

OUR ASTRONOMICAL COLUMN.

AUGUST METEORS.—The most interesting and important season of the year for meteoric work has now arrived. The Perseids return regularly in August, and always repay observation, though there are marked variations in their annual displays.

During the last few years this shower has scarcely justified expectation, but the conditions have not been very favourable. At the ensuing return possibly the meteors may return in their old-time abundance, but there will be a little interference from moonlight before midnight. This need not, however, materially affect the character of the display, for on the nights of August 11 and 12, when the maximum will occur, our satellite will be only just past the first quarter, and will set on August 11 at 11h. 13m., and August 12 at 12h. 9m. p.m.

It seems desirable to watch the phenomenon closely every year for several reasons. Its period is not yet exactly ascertained, and we are not sufficiently well acquainted with its annual variations. The hourly number of meteors visible should be determined, and the time of their maximum abundance. It is also important to record the apparent paths of such brilliant meteors as may be visible.

In the case of fireballs the lingering streaks give evidence of rapid currents in the upper atmosphere, and should be specially watched. It will be useful to note the position of the streaks amongst the stars and to record the rate and direction of their drift, at short intervals, during the period of their visibility. The streaks are usually from sixty-five to fifty-five miles in height.

Directly a streak is seen a telescope or field-glass should be directed towards it. A streak which remains visible to the naked eye a few seconds can sometimes be watched for five or ten minutes with a glass.

It is astonishing how many of the meteors of the August stream are destroyed every year by collision with the earth's atmosphere. Basing calculations on observed facts, it is probable that between 80 and 100 millions of these meteors are encountered every year. This great annual expenditure might be thought to have a perceptible effect in diminishing the visible numbers, but when we remember that Prof. H. A. Newton computed the number of meteors in the August system as 300,000,000,000,000, it is certain that any apparent falling off in the richness of the shower would only become sensible after many thousands of years.

DISPLACEMENT OF SPECTRUM LINES OF METALS DUE TO IMPURITIES.—An important piece of research work, chiefly interesting to spectroscopists, is that recently communicated by M. Keivin Burns to the *Comptes rendus* for June 30 (vol. clvi., No. 26, p. 1976). M. Burns finds that the presence of a large proportion of luminous vapour in an arc of iron or mercury displaces the spectrum lines of those metals contained in a small proportion in the arc (such as barium, manganese, cadmium) in relation to the positions they would occupy if the metals which produced them were predominant. He suggests that this displacement may be the result of numerous particles in a special condition where they emit light and not of ordinary molecules or atoms; the displacement is not explained by a pressure effect. He points out that the existence of this displacement does not render it prudent to use such lines of impurities as standards in attributing the wave-lengths found from measures made under other conditions.

CIRCULATION IN THE SOLAR ATMOSPHERE.—Anyone who has closely studied a number of photographs of solar prominences photographed on the limb of the sun would have the idea of solar currents brought to his mind.

A systematic study of a large number of such photographs becomes therefore of extreme interest from the solar circulation point of view, and such a study has been undertaken by Prof. Slocum, of the Yerkes Observatory, from spectroheliograph photographs he has taken with the large Yerkes refractor. His second